

Space Research: Organizing for Economical Efficiency*

A. Johnson

J&A Co., New York, USA

Abstract

At present time the USA's Federal Government spends big money for an aviation/space R&D. How to best organize these activity, how to best estimate its utility and profit (real and potential), how to best increase efficiency, how to best estimate new ideas and innovations, how to properly fund R&D of new ideas and innovations, and how to correctly estimate their results - all these macro-problems are important for successful planning of aviation and space research, new launch and flight systems. Author considers these major problems and offers many innovations in organization, estimation, suggests new research efficiency criteria, development, new methods for assessments of new ideas, innovations in space industry, and new methods in patenting technology.

The author worked for many years within the USA's Federal Government entities (scientific laboratories of NASA, Air Force, Army), universities and private sector companies. He is the author of more than 100 scientific articles and books, patents.

*Accepted as AIAA-2006-7224 by Conference "Space-2006", 19-21 September 2006, San Jose, California, USA. This manuscript was withdrawn before 5 days to Conference by session chairmen Guy Jette and Paul Eremenco by demand of general chairman Joanne Maquire and program chair David Brandt (Lockheed Martin Co.). This case shows the total corruption of aerospace industry in the USA.

Key words: Organizing scientific research, planning of research, funding research, funding new ideas (concepts), funding inventions and innovations, estimating research cost, assessment of research results, research efficiency criteria, innovation in organizing of scientific R&D.

Contents:

1. Introduction
2. Support of new concepts
3. Studies of Innovation
4. Government relation
5. NIAC (NASA Institute for Advanced Concepts)
6. NASA (National Aeronautic and Space Administration)
7. DARPA (Defense Advanced Research Project Agency)
8. NSF (National Science Foundation) and Government Research Laboratories
9. SBIR - Small Business Innovation Research
10. Publications
11. Patenting
12. Summary

1. Introduction

Since beginning of the Twentieth Century, science and technology have held the main role in human progress. Humanity created more new knowledge more than during many previous

centuries. People researched aerodynamics, flight dynamics and the design of aircraft. Trained people developed rocket theory and traveled to outer space and the Moon. Organized research focused on nuclear physics began the exploration of nuclear energy and the creation of powerful computers, which help in further study of Nature. Astronomy's devices allow humans to see and study worlds located millions of the light years beyond Earth.

The power and influence any modern State in our World is defined by its science, technology, and industry. The USA is a World leader because, for many years the USA industry and national government spent more money than any other country to R&D science-based technical innovations. For example, the USA funds space research more the all other countries combined. In that way the main scientific advances in space, aviation, and computers are made in the USA.

If the people of the USA still want to continue to be the World leader, they must continue this practice and further refine this public and private policy. However, it is possible when the country has competitors and takes part in a competition struggle. The man on Moon became possible because the former USSR launched the first satellite (1957) and the USA leaders understood the USA had temporarily lost World leadership in important field of science and technology. Only in 1969, after the first manned flight to the Moon, did the USA return to undoubted leadership in space. That program ended in 1972. However, before collapse (1991) the USSR launched more satellites than all the rest of the World together, including the USA! The USA decided to restore this program only when China announced its program of manned Moon exploration.

The second very important side of scientific R&D is the efficient use of available funding. The financing of any project is limited everywhere, every time. Unlimited funding is inconceivable. The right organization of scientific funding and research is a very important element of scientific progress. That includes: organizing and selection of the most feasible prospective ideas and innovations for research, selection of a "can do" principal investigator - scientists who is the author or enthusiast of this idea, right estimation of the project cost, reached results and perspectives of applications.

All these problems are very complex for investigations. However, there are common criteria that help to solve these problems of selection and organization and save a lot of money and achieve practical success in short period of time.

The investigation of these macro-problems is impossible without consideration of current systems and uncovering (critics) its disadvantages. The author suggests new criteria and new forms of organizing science funding that were tested/applied in limited cases and which show a high efficiency. He also offers new criteria for estimation of science results which allows more evenly to estimate the honesty of finished scientific work reports by specialists and to separate pseudo-scientific or non-honest works.

For customers, leadership and management is also very important for correct estimation of the cost of an offered research, a capability of principal investigator, group, or organization to do this research. Unfortunately, the practice shows mistakes occur very often and they cost millions of dollars. The author suggests a set of simple rules that allow avoiding the big mistake and big slips in planning of research works.

The human element is very important in the selection and distribution of limited funding. In many organization we observe and comment on the situation when large government money distribution—money shifted from all taxpayers to just one man. As the result he begins to

give money to his friends, to his colleagues or worse - to take bribe. He keeps elementary information about the activities of his organization secret. The author offers a method for selections making this practice difficult to initiate or continue, allowing avoidance of criminality.

2. Support of new concepts

The monetary support of new aviation and space concepts is the basic component of technical progress. All useful things, which we see around us everyday, were developed from new concepts, ideas researched in past. What is the situation now? Consider the state of affairs now.

Science and technology are very complex and have very high level now. The production of new valid concepts and ideas, and the effort to fully substantiate them, can ONLY be done nowadays by highly educated people. The USA has hundreds of thousands of conventional scientists. New concepts and ideas generate only very talented people (genius). They are a few in a group of thousands of scientists. That requires from them very much time and hard work. That is not paid work in government or company laboratories. The Government and private laboratories develop ONLY known concepts and ideas because their purpose is to get maximum profit in shortest time; that means to produce and substantiate new ideas can only scientist into his own private time. There are a lot of scientists, but most of them do conventional researches of well-known ideas and small improvements them, all scientists earn money. All countries are funding science and research, but they do not usually fund new ideas or concepts. Rather, they assimilate known new technology, often developed in other countries. The funding for new concepts and ideas are zero in the World!!

In all countries the composers, writers, artists receive a royalty for performance of their musical compositions, books, works of Art. Why must scientists gift their hard work on new concepts, ideas, theories, and equations for computations? It is just if companies used their method of computation to pay a small (\$1000) royalty for author.

3. Studies of Innovation

The development of new concept and idea can be presented in 4 stages (fig.1). Efficiency, E , is possible profit, P , divided by cost, C , of realization.

$$E=P/C. \quad (1)$$

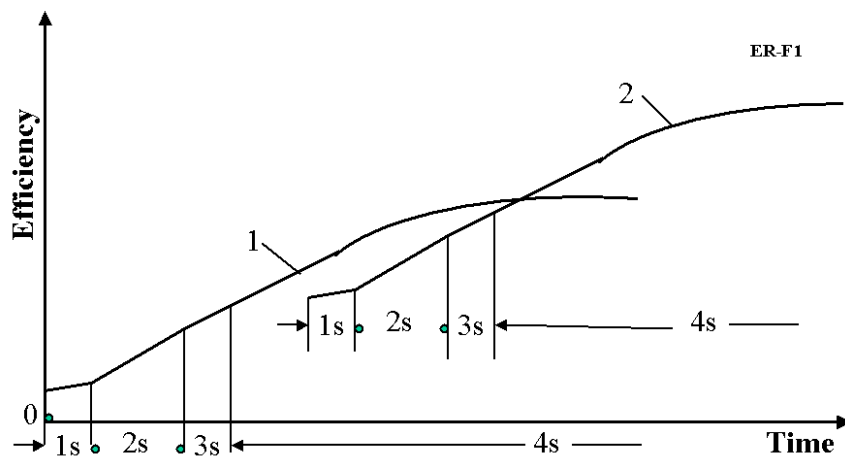


Fig. 1. Four Stage innovation development.

The innovation development has 4 stages:

- 1) The first stage is discovery of new concepts or idea. That stage includes an appearance of new idea and INITIAL RESEARCH of its possibilities and main conditions that are requisite for its practicability, initial proof of reality. A person can be only author of a new concept or idea if he/she made initial research and showed that this idea may become a future technical reality. A person who ONLY gave the idea (point 0 in fig.1) is NOT its author because it is easy to produce a lot of ideas that are beneath or beyond realization. For example, the fantast Jules Verne (1828-1905) penned his famous book about the first manned flight to the Moon using a huge cannon. Is he author of the idea for manned flight to Moon employing a big gun? No. Even primitive research shows that a human cannot tolerate the acceleration that is caused by this method, where the vehicle is a cannonball.

The first stage is ONLY theoretical; strong individual and talented enthusiast in own time without any support because unknown concept or idea cannot be in government or company plan.

- 2) The second stage started after publication or public announcement of the primary idea during a scientific conference. Other researchers join the investigation of the new idea and make more detailed researches. Most of this new idea research is theoretical, and only a small part may be experimental.
- 3) The third stage includes the production of appropriate experimental examples.
- 4) The fourth stage is actual production of marketable versions of the idea.

We show the development of one innovation (curve 1 in fig.1). However, any concept exhausts itself and its inherent efficiency possibilities over time. The new concept (idea) appears which promises even more efficiency (curve 2 in fig.1). Conventionally, in initial time that has less efficiency than old idea, but in future the innovation efficiency became significantly more than old idea.

For example, as people use an idea to connect a vehicle to horse. Later they invited a motor vehicle. Then they developed air vehicle. At present, humanity is developing space vehicles.

4. Government relation

Currently, the most important First Stage is the most difficult situation. No Federal or reliable private sector funding, no extraneous technical support of any kind. This work can do ONLY enthusiasts at one's own expense. Funding of the new perspective concept or idea is needed AFTER its initial theoretical research by a widely system of awards and prizes. For example, the Director of NIAC, Mr. Cassanova, made a sinecure for his friends from funding grants BEFORE theoretical research. Most NIAC works are pseudo-scientific researches (see below in section NIAC).

Recommendations:

There is only one solution of this macro-problem – the USA's Government must install the series (3 - 5) special national Government prizes (awards about \$100K) in every important scientific field (space, energy, computer, biology, physics, etc.) for new concept scientific researches that are:

1. Given ONLY for new concepts and ideas developed by author and published or presented in scientific conference or Internet (stage 1 in fig.1).
2. The awards must be given ONLY to individuals.

3. The competition must be OPEN, advertised widely in public notices. ALL pretenders and their work and proposals announced BEFORE any awards.
4. The awarding Committee must be from independent well-known scientists in given field. The same awards may be also in stage 2 (developing new concept or idea by non-author of this idea if the author of idea is awarded; or non-author make significant innovations which develop or solve problems important for progress this idea). In stage 3 the grants can be given ONLY for experiment or model.

5. NIAC (NASA Institute for Advanced Concepts)

The non-experienced reader objects - there exists NIAC (NASA Institute for Advanced Concepts) that must support new concepts and ideas in aerospace. The World press wrote—sometimes—that NIAC Director Mr. Cassanova made from this good idea the sinecure for his friends, protégés and useful people (<http://NASA-NIAC.narod.ru>).

Mr. Cassanova invented new method of aggravated theft of Government money: he awards his friends with millions of USA tax dollar just for promising to make a revolutionary discovery. In other places awards are given for well-known published scientific works in OPEN competition. It is impossible that Nobel Prize was given for promising to create epoch-making. But Mr. Cassanova awarded the theoretical works before they were ever presented to an established scientific society! As a result, the applicant received money before researching and present an empty and pseudo-scientific "research"!

Mr. Cassanova (NIAC) announced that every proposal is reviewed by 6 reviewers (3 internal + 3 external reviewers), but he refuses to identify or present these reviews. Why?

The explanations are very simple: NO review panels, NO peer reviewers, NO scientists who took part in the review process, NO voting, NO scientists who see the proposals! Everything is just fabricated fiction. There is only just Mr. Cassanova in NIAC who changes all reviewers, all scientists (in all scientific fields!), all panels, and all debates. Who distributes un-enumerated millions government (taxpayers) money to friends and insiders.

What kinds of proposals are awarded money supports by Mr. Cassanova? An important part of the answer to this question can be easily found by the reader at a website: <http://NASA-NIAC.narod.ru> and others.

Overview: The NIAC spent more 40 millions dollars in 8 years, but they did not really put forth any really new concepts or ideas! The most NIAC final “research” reports are idle talk (no scientific results, no pre-production models, no correct scientific report, the final reports content a lot of scientific mistakes, and so on). For example, the final reports don’t have any scientific results: Space Elevator (award about 1 millions dollars), Bio Suite (awards about 1 millions dollars), Chameleon Suit (award about 1 millions dollars), Weather Control (awards about 1 millions dollars), Winglee M2P2 MagSail (award about 2 millions dollars), Cocoon vehicle (work contains only scientific mistakes), anti-matter sail (empty useless non-scientific 7 pages work), and so on (see Final Reports in <http://NASA-NIAC.narod.ru>).

Now the NIAC is just a private manger for “friends” and has spent 90% of government-issued taxpayers money not very effectively, and specifically in fraudulent and criminal ways (see <http://NASA-NIAC.narod.ru>).

For example, Mr. Robert Cassanova awarded four times millions of dollars to the following persons: *Howe S., Colozza A., Nock K., Cash W., Dubowsky S.* He also awarded three or four

times millions of taxpayer contributions to these persons: *Hoffman R. Maise G., McCarmack E., Rice E., Slough J. Kammash N., Winglee R., Newman D.*

The Science Committee of the organization "*Citizens Against Government Waste*" (CAGW) awarded NIAC and Mr. Cassanova the "**Pseudo-Nobel Prize-2005**" for wasting millions of taxpayer dollars by pseudo-scientific works (GOTO: <http://www.geocities.com/auditing.science> or <http://auditing-science.narod.ru>).

Recommendations:

The President and Congress of the United States of America, needs to, and must, thoroughly investigate the NIAC situation and must punish, and remove, NASA and USRA leaders who allow, and create the abuse and corruption from, and by, NIAC. The Science Committee of CAGW stands ready to present to a Special Investigation Commission the documents that confirm the statements presented and outlined in this article.

In this saddening and costly national situation, it is the best decision, to stop the wasteful and ineffective financing of NIAC and pass their functions to Independent Committee created from well-known scientists, or NASA can create its own Committee from eminent volunteer scientists or to pass selected managerial functions to the National Science Academy, or National Science Foundation and to send awards only to finished scientific works in OPEN competition, or pass these vital functions to the growing and historically relevant and important International Space Agency Organization (<http://www.international-space-agency.org> or <http://www.isa-hq.net>) which would be better suited, and able, to stimulate, enable, and promote advanced space launch, propulsion, power, orbital, and planetary grant disbursements, R&D and implementation. This is based on an ever-increasing need for global cooperation, collaboration, common effort, and universal viewpoint. The International Space Agency's Directives, Charter, Purpose, Goals, and Certificate of Incorporation reflects this reality far better than the USRA or NIAC directives or charters. The many millions in Government-dispensed tax monies & private sector money and other relevant resources would be better used under the management and oversight of the International Space Agency Organization.

The CAGW Science Committee has available already an offer to NASA for a detailed plan on how to improve the work of NIAC, making it more open and its product more useful, and to change the dismal situation when one too-powerful and influential person, exemplified in the person of Mr. Cassanova personally distributes tens millions of taxpayer money with no safe guards or oversight.

This plan includes three conventional conditions:

1. Independent selection Committee having widely-known E-mail address.
2. Open competition with publication of all nominated scientific works on Internet, including assessments made by scientists before any funding awards.
3. Awarding ONLY MADE scientific works not supported from other sources.

Discussing

The CAGW Science Committee considered, in detail, seven of about two hundred awards made by Mr. Cassanova (GOTO: <http://www.geocities.com/auditing.science> or <http://auditing-science.narod.ru>). Amazingly, 90% of the "final reports" are just idle talk giving the impression to readers that there are NO talented scientists in the USA! That means, obviously, that the system of funding and awarding of scientific works is wrong. Mr. Cassanova is a university system employee and he evidently tries strenuously to fund his friends and protégés within his system of work. However, universities take the funded money and do not pay them over to

professors who receive their fixed salary. Often, a professor is overloaded by lectures, direct work with talented students and ordinary classroom examinations. Such a person does not have time or the possibility to make serious research that requires huge efforts and much time. That's why he/she wrote the idle talk report, pseudo-scientific work!

The USA National Research Council (NRC) and ORAU (Oak Ridge Associated Universities) found the best solution of this problem – one send scientists to government research centers or laboratories and they works full time 1-2 years into it.

Conclusion

The best way is to withdraw this function and this money from NASA-NIAC-USRA, pass them to Special Government (or the National Academies, ISA) Committee includes famous scientists and to award the published works (researches) containing new concepts, ideas, inventions, and innovations. Make it in an open competition!

The Nobel Committee is not awarding the person who only promised to make notable research. Why does Mr. Cassanova give out millions of American taxpayer dollars to his friends without any control and government auditing? Any non-scientist can see that their “final reports” are idle talk, non-scientific works and do not cost the gigantic money which Mr. Cassanova gives his protégé.

6. NASA (National Aeronautic and Space Administration)

The NASA announced that it invites new concepts and ideas and publicizes the address where scientists can send their researches and proposals. I personally know excellent scientists who have sent more than twenty R&D proposals documents to this address:

NASA HEADQUARTERS, Unsolicited Proposal Coordinating Office
 Attn: Sandy Russo, proposal coordinator, Code 210.H
 Goddard Space Flight Center
 Greenbelt, MD 20771
Sandra.R.Russo@nasa.gov

Some of them included in their letters a US Postal Service green return receipt postal card. But some months they have not received not only reply from NASA but they cannot receive their postal card - confirmation about receiving research and proposal. That means - all NASA appeals about innovations are FICTION. NASA became a gigantic organization that spends huge taxpayer money and has the lowest scientific efficiency in the World.

Example #1: The former USSR spent money for Space in 3-5 times less then NASA and had a weak industry, but one was a leader of space research in 1957 - 1969 (before American flight to Moon) and one launched more satellites up to 1991 (when the USSR collapsed).

Example #2: In 1998 one scientist proposed a means to send to Mars a probe containing hundreds cheap micro-balloons. Every balloon was to have a micro-camera, other devices and radio-translator connected to the planet orbiting main Mars satellite. The balloon can sustain flights for months and transmit detailed close-up Mars pictures. However, the NASA spent tens millions dollars in non-scientific project of small model of aircraft which can make only one non-controlled flight of a couple of miles. Why? The reason is simple and apparent - in 2003 it will be 100 years of Wright brother flight and for public propaganda needs NASA sought a quick

propaganda "achievement". Result: NASA spent about 100 millions dollars but cannot send the model of aircraft.

Real scientists who have in the past and still today cooperate with NASA quietly note the low skill level of many NASA employees. I know very highly educated (two Ph.D.), experienced scientist (author more 100 scientific works and tens inventions, who applied in NASA open position of project manager. The personnel department informed him that he doesn't have a needed score for possible candidate. He applied in three open NASA positions of research engineers. The answers were same. He tried to get Government investigation of this case. Commission ascertained: the NASA took these positions the people having only B.D., did not have experience, published scientific works, patented inventions.

After collapse of the USSR, the NASA loss of an international rival transformed the NASA into a monster that wastefully consumed about \$15 billions and produced very few scientific achievements, but a lot of space catastrophes. For example, since 1972, during a period of 34 years, the NASA has sent no manned flights to the Moon. Only now, following China's announced Program of Moon Exploration, the USA Government understood the USA gap and requests the NASA to reorganize its Program.

Recommendations:

1. NASA must be separated into two independent, rival organizations. The funding of them must depend solely on their progress in Space.
2. The leaders of programs and leader-scientists must be selected in OPEN competition on limit time (time of project). The open competition means that the data of applicators must be published on the Internet BEFORE selection of them by scientific Committee. Now everywhere in the USA (in state and government positions) the open competition of applicants is absolute fiction because of the public absence of data of any selected candidate (education, experience, number of publications and awarded patents).
3. NASA must create the independent Scientific Committee for OPEN consideration the scientific works and proposals that are presented to NASA, awards for useful MADE researches and recommends perspective works for subsequent investigation. NASA can advance funding only research that use special equipment or make a model. NASA must install the NASA prizes for individual researchers who have openly offered new concepts and ideas.

1.

7. DARPA (Defense Advanced Project Agency)

DARPA is special government organization for promotion and development of new concepts and ideas. I know scientists that sent their proposals to DARPA for consideration. They received an exceedingly strange answer: "Your proposal no in out plan!" How new (unknown anybody!) concepts or idea to be in DARPA plan? That is sent for consideration and including in plan! That means the DARPA is operating out its main purpose - careful consideration of serious proposals and their financial support. The plan makes not Science Committee from well-known scientists. That makes bureaucrats according with corporative interests who spent hundreds millions of dollars for projects which cost in hundreds times less.

Example. The DARPA decided to produce a micro-craft that allows the soldier to see what is behind a building, bushes, forest, etc. That is very important for saving the lives of soldiers in conditions of wartime and policemen during peacetime. The industry produced micro TV camera (volume is 1 cm³, weight 3-5 g together with battery), radio control for small aircraft models (you have seen the children radio control cars).

How will experienced man do it? There are millions of hobby model aircraft constructors in the USA. They do not know high science. But they can produce many models and experimentally select from the best. Experienced officer announced a prize (\$100 - 200K), after 6 months make a competition, selected and to get a product ready.

What do DARPA bureaucrats make? They go conventional way, enlisting the usual universities and the usual scientist-professors. DARPA spent many millions of dollars on research committed by professors and big-name universities. They received tons of equations and not a single flight model!

After the reckless waste of \$100 millions the DARPA passed this project to Air Force Laboratories. They continue this wrong innovation method by spending even more millions of the American taxpayers money. I took part in summary reports of universities. What is typical situation? The university got a grant (about \$100K). They present the report with equations, model made in Air Force Laboratory. They reported about 8 tests of this model (5 times is successful, 2 times is partially successful, and 1 time unsuccessful). I offered to go out from building and repeat test – to reveal what is behind a certain building. They would not agree. Why? Reason: all testing were not successful, model is not control and cannot do the needed function (recognizing).

Recommendations: Special Science Committee for consideration of proposals, open competition and publication of Abstracts of all proposals.

8. NSF (National Science Foundation) and Government Research Laboratories

All problems of DARPA have place in NSF and Government Research Laboratories. See Recommendation above.

9. SBIR - Small Business Innovation Research

All problems above are same for SBIR. The SBIR considers practically only proposals corresponding plan, topics of given department. Idea of SBIR is funding innovations of small business (group, individuals). But its small business is definition is an organization having 500 employees! That allows the universities and big companies separated their department and presented it as "small business". We have a similar situation with NIAC - employees have salary and not interested in given innovation, hard works.

Common note: Most universities, small business and proposed work project initiators are interested ONLY in getting money grants. They do not have need scientists (especially enthusiasts), needed experience in given field, needed equipments. In most cases, the grants are given on the quiet. It is essential to have coattails. As the result, the customer—the American taxpayer—receives empty works, pseudo-scientific research.

Example.

I want to give one example of relation of noted organizations to revolutionary innovations.

I personally know one Moscow, Russia university professor. He is a well-known specialist in structural strength, having many scientific works and books. He invented a new location of stringers on thin casing which increases a shell's stability by 2 - 3 times (that means a decreasing weight of aircraft, missile, ships structure of about 20 - 30% - surely a revolution in aviation, rockets, ships). He TESTED his innovations in Moscow and received excellent results. He arrived in the USA and began to offer his innovation to NASA, DARPA, Air Force, Department of Defense, NAVY, commercial and military aviation companies. He did not ask immediately for a research grant, he merely asked only to test conventional structures and his stronger panels

and make sure of his findings. He spent some years seeking such help. Everywhere, he doesn't receive answers, or received empty formatted replies, or answer - his innovation absents in plan. That means: all noted bureaucratic organizations retard progress by the USA.

10. Publications

There are well-known organizations such as the American Institute of Aeronautics and Astronautics. One makes a big work, organizes aerospace conferences and publishes a series of aerospace journals. But it doesn't have support from government and NASA and it became a strictly commercial organization. For example, the cost of participation in AIAA conferences is very high. That means only employees of government and big organizations can take part in scientific forums. But they show only conventional R&D plans. The new revolutionary ideas and researches are made by talented individuals, enthusiasts in their free time. They can make a revolutionary research, but they do not have a lot of money (some thousands of dollars) for payment of trip, hotel and conference fee. Literally, the USA losses these revolutionary researches.

Editors of AIAA journals do not get salary for their arduous efforts. That means they want to see their name in every copy of journal, but they do not want to work as editor. They pass article to reviewer and pass review to author. That function can be done via computer. Some of them converted the journal in private edition for their friends and protégé. For example, all 20 revolutionary researches published in recent comprehensive book "*Non-Rocket Space Launch and Flight*", Elsevier, London, 2006, offered for publication in AIAA "*Journal of Power and Propulsion*" (*JPP*), but all were rejected by editor-in-chief **Vigor Yang** as researches are written non-American style and having poor English. What is "American style" he cannot explain, English the readers can see the book and decide: is it important reason in refusal in revolutionary innovations? For some last years the "*JPP*" have not published any revolutionary ideas, but published many articles having principle scientific mistakes. The same situation with AIAA "*Journal of Spacecraft and Rockets*" (Editor-in-Chief **Vincent Zoby**).

It is bad, that the USA has only single journal about power and propulsion system or spacecraft and American authors must publish new ideas and researches in abroad journals.

It is bad that commercial publishing houses do not want to publish scientific literature, because it is not profitable. As a result, the scientific literature (and text-books) are very expensive and prohibitive not only for students, but for scientists.

It is bad that no free scientific Internet library and AIAA sells every scientific article for \$10.

Recommendations:

1. The USA must have minimum two rival journals in every scientific field. Every journal must have Appeal Commission where author can complain if he/she does not agree with editor clearly stated reasons for article rejection.
2. Every National Conference must have small fund for supporting the individuals presented revolutionary research and give them possibility to address a meeting.
3. Government and NASA must support with appropriate funding the points 1-2 above (scientific journal and scientific conferences), the AIAA (and all big old Scientific Societies), the scientific publishing houses, the free scientific Internet library.
4. The AIAA (and all big old Scientific Societies) must free publish in Internet all manuscripts presented in AIAA Scientific Conferences.

The Government, country loss more on obstacles which exists for appearing and applications new ideas, the most of them produced by individual talented researchers.

11. Patenting

The USA Constitution proclaims a support of science and patenting. Unfortunately, the USA PTO (Patent and Trademark Office) had become a powerful means to extract money from inventive people. The Payment for PTO equals some thousands dollars and prohibitive for individuals. The patenting approval process continues for at least 1-2 years. If the inventor complains, the PTO can sabotage all your inventions. I personally know of a case when an inventor paid for invention but PTO did not give a patent. The PTO creates a lot of Rules that permit the pumping of money from people and that allows the sabotaging of the patenting process.

Recommendations:

1. Now the PTO has rates for big Companies and for small Business. It must be a special rate for individuals and FULL payment (application, patenting, and maintenance) must be not more \$100 for them.
2. It must be category "important patents for Department of Defense and the USA". If Special Committee recognized a patent application as necessary (important) for Department of Defense or the USA, the applicant has a right to a free patenting (he received only author certificate, the Government get all patent rights), all USA organizations or companies can use this patent but they must pay its author 1% and PTO 1% from cost of product used under this patent.
3. All income received by PTO must be used for support of individual inventors.

12. Summary

Current system organization and funding of science researches is not efficiency especially for NIAC, NASA, DARPA, DoD, AF, SBIR, NSF, PTO. They need reorganization. Main components of reformation must be the following:

1. The unwise and wasteful practice of advance funding of primary theoretical researches must be stopped and changed to OPEN competitions in any given field and in given topics. NASA must stop funding NIAC and must demand from USRA to return money held by Mr. Casanova's group.
2. Government must install 3-5 annual Government Prizes (about \$100K) in every important field of science (space, aviation, computer, physics, biology, energy, etc.) for important THEORETICAL achievements made by individuals.
3. The company used new method of computation must pay small (\$1000) royalties to authors from every use.
4. NASA must be divided into two independent rival organizations.
5. The main method funding of research must be not funding Universities but it must be the work of University scientists done during 1-3 years as Fellow researchers in big Government laboratories.
6. NASA, DARPA, Government laboratories must engage a head and main specialists of every project in OPEN concourses, preferably the authors of project (proposal) and scientists made main contributions in the project idea or concepts.
7. The Government must support main scientific journals, publishing houses, free Internet scientific libraries; individual scientists presented an important researches to scientific national conferences.

8. Government must make special small rate (<\$100) for individual inventors, free patenting of important for DoD and the USA inventions and to use all PTO profit for support individual inventors important for DoD and the USA.

Referenses

1. GOTO: <http://NASA-NIAC.narod.ru>
2. GOTO: <http://www.geocities.com/auditing.science> or <http://auditing-science.narod.ru>